

Remarks

This is in response to the Office Action mailed on October 11, 2001, in which claims 1-8 and 22 were rejected under 35 U.S.C. § 112, second paragraph, claims 1-3, 6, and 22 were rejected under 35 U.S.C. § 102(b), and claims 4, 7, and 8 were rejected under 35 U.S.C. § 103(a). With this amendment, claims 1, 5, and 22 have been amended. Claims 1-8 and 22 remain pending in the application. Reconsideration and allowance of all pending claims are respectfully requested.

In section 2 of the Office Action, the Examiner rejected claims 1-8 and 22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Examiner requested clarification in claims 1 and 22 as to whether the terms "a piezoelectric substrate" and "the substrate" are the same or different substrates. Applicants have amended claims 1 and 22 to clarify that the substrate described throughout both claims is the piezoelectric substrate. Reconsideration and allowance of claims 1-8 and 22 are respectfully requested.

In section 4 of the Office Action, claims 1-3, 6, and 22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,426,340 to Higaki et al. Applicants respectfully traverse this rejection. Claim 1 requires a piezoelectric substrate with first and second interdigital transducers formed on a surface of the piezoelectric substrate. Claim 1 further requires that the piezoelectric substrate include a doping region.

Higaki, on the other hand, discloses an acoustic wave device including a piezoelectric layer 4, interdigital transducers 5 formed on the piezoelectric layer 4, and grounding electrodes 3. See Figure 8 and column 7, lines 21-34 of Higaki. Higaki notes that in the case where the piezoelectric layer and the grounding electrodes are formed of the same material, such as ZnO, the grounding electrodes may be formed by doping the grounding electrodes with a metal element. See column 7, lines 62-column 8, line 7 and column 10, lines 58-59. It is apparent from this description that Higaki discloses only the doping of the grounding electrodes 3. Higaki fails to disclose a doping region formed as part of the piezoelectric substrate, as required by claim 1. } X

The rejection states that Higaki discloses a doping region with a thickness of 50 nm, citing column 10, lines 58 and 59 of the specification of Higaki. Applicants respectfully traverse this interpretation of Higaki. The region described in Higaki does not function as a doping region as required by claim 1. Higaki discloses a 50 nm layer including Al. Higaki further states that interdigital transducers are formed on the Al layer using a photolithography method. Column 10, lines 60-65. However, if the interdigital transducers are formed on the metal Al layer as described, the interdigital transducers would be short-circuited through the metal layer, rendering them non-functional. To create a functional embodiment, it would be necessary to etch the Al layer to form the interdigital transducers. Therefore, even assuming, for the purpose of this argument only, that the Al layer is a doping region, Higaki fails to anticipate claim 1 because Higaki fails to disclose a piezoelectric substrate with first and second interdigital transducers formed on a surface of the piezoelectric substrate, with the piezoelectric substrate including a doping region.

Consequently, for at least the reasons stated above, Higaki fails to anticipate claim 1. Reconsideration and allowance of claim 1, as well as dependent claims 2-8, are respectfully requested.

Regarding claim 22, an acoustic wave device is required including, in part, a piezoelectric substrate including a plurality of conductive regions spaced apart from each other between first and second interdigital transducers. Claim 22 further requires that a tunnel current flow between the first and second interdigital transducers via the conductive regions. The rejection asserts that Figure 1 of Higaki discloses a plurality of conductive regions 11 between first and second transducers and that current flows between the first and second transducers via the conductive regions. Applicants respectfully traverse this interpretation of Higaki. In column 1, lines 20-38 of Higaki, Figure 1 is described as showing a surface acoustical wave device 40 including a piezoelectric body 44 with interdigital transducers 43 and 43' formed thereon. Higaki fails to disclose or suggest a plurality of conductive regions spaced apart from each other on a surface of the piezoelectric substrate and a tunnel current that flows between the first and second interdigital transducers via the conductive regions, as required by claim 22. Therefore, for at least these reasons, Applicants suggest that Higaki fails to anticipate claim 22. Reconsideration and allowance of claim 22 are respectfully requested.

In section 6 of the Office Action, claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Higaki in view of U.S. Patent No. 5,923,231 to Ohkubo et al. In addition, in section 7 of the Office Action, claims 4 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Higaki in view of ordinary skill in the art. Applicants respectfully traverse both of these rejections under 35 U.S.C. § 103(a). For at least the same reasons as presented with respect to claim 1 above, claims 4, 7, and 8, all of which depend from claim 1, should also be allowable over Higaki. Reconsideration and allowance of claims 4, 7, and 8 are respectfully requested. Applicants do not concede the correctness of the rejections' positions on the features of claims 4, 7 and 8.

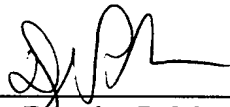
In section 9 of the Office Action, the rejection states that claim 5 was not considered because it allegedly presented a method of making the device which is not germane to the issue of patentability of the device itself. Applicants respectfully traverse the failure to consider claim 5. However, claim 5 has been amended to more clearly claim the substance of the device itself rather than a method of making the device. Consideration and allowance of claim 5 are respectfully requested.

In view of the above amendments and remarks, claims 1-8 and 22 should be in condition for allowance. Consideration and allowance of all pending claims are respectfully requested. If the Examiner should feel that an interview would be beneficial in moving this case into condition for allowance, the Examiner is encouraged to contact the undersigned attorney at 612.371.5237.

Respectfully submitted,
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